$\therefore\ u=\frac{4395}{59319},\ v=\frac{4519}{59319},\ x=\frac{4737}{59319},\ y=\frac{6122}{59319}$.

Let $a=4$, $b=7$, $c=8$, $d=17$, $h=18$.

$\therefore\ u=\frac{11728}{157464},\ v=\frac{12007}{157464},\ x=\frac{12176}{157464},\ y=\frac{16577}{157464}$.

Other values can be found for u, v, x, y.

77. **Proposed by JOHN M. COLAW, A. M., Monterey, Va.**

Find (1) three consecutive numbers whose sum is a cube, and (2) three consecutive numbers the sum of whose cubes is a cube.

Solution by M. A. GRUBER, A. M., War Department, Washington, D. C.

(1). Let $n-1$, n, and $n+1$ be any three consecutive numbers.

Then $(n-1)+n+(n+1)=3n=$a cube$=27m^3$.

Whence $n=9m^3$.

$\therefore$ $9m^3-1$, $9m^3$, and $9m^3+1$ are the general expressions for three consecutive numbers whose sum is a cube.

Take $m=1$; then $8+9+10=27=3^3$.

Take $m=2$; then $71+72+73=216=6^3$; etc.

(2). $(n-1)^3+n^3+(n+1)^3=3n^3+6n=$a cube$=27m^3$.

Whence $n^3+2n=9m^3$.

Put $m=an$; then $n^3+2n=9a^3n^3$.

Whence $n^2+2=9a^3n^2$; and $n^2=2/(9a^3-1)$.

To obtain n integral, a must be fractional.

Put $a=1/b$; then $n^2=2b^3/(9-b^3)$.

To avoid imaginary results, $b<2\frac{1}{12}$.

The only integral values that can be assigned to b are 1 and 2.

Take $b=1$; then $n=\frac{1}{2}$.

Whence $(-\frac{1}{2})^3+(\frac{1}{2})^3+(\frac{3}{2})^3=(\frac{3}{2})^3$.

Take $b=2$; then $n=4$.

Whence $3^3+4^3+5^3=6^3$.

This is the only set of three consecutive integers the sum of whose cubes is a cube.

Fractional values of b give fractional values for n.

When $b=0$, $n=0$.

Whence $(-1)^3+0^3+1^3=0^3$.

Also solved by *CHARLES C. CROSS*, *JOSIAH H. DRUMMOND*, *ALOIS F. KOVARIK*, *NELSON L. RORAY*, *J. SCHEFFER*, *ELMER SCHUYLER*, and *G. B. M. ZERR*.

AVERAGE AND PROBABILITY.

81. **Proposed by LON C. WALKER, Assistant in Mathematics, Leland Stanford, Jr., University, Palo Alto, Cal.**

Find (1) the mean distance of all points on a side of an equilateral triangle from the opposite vertex; and (2), the average length of a line drawn at random across an equilateral triangle.